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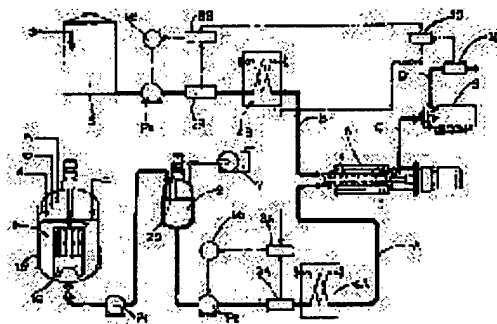
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(54) CONTINUOUS MIXING EMULSIFIER FOR DRESSING-BASED COMPLEX SOLUTION

(57)Abstract:

PROBLEM TO BE SOLVED: To provide an apparatus capable of preventing the oxidation of dressing as much as possible and continuously mixing and emulsifying the dressing sanitarily without fear of admixture of foreign matters, by carrying out operations from the mixing of a seasoning solution through the blending of an oil with the seasoning solution under stirring to the finish emulsification by the wholly closed inline system and removing air in a liquid by using a deaerator.

SOLUTION: In this continuous mixing emulsifier for a dressing-based complex solution, a seasoning solution transporting line A in which a blender 1 for the seasoning solution, a deaerator 2, a flowmeter 3A and a heat exchanger 4A are installed in series and an edible oil transporting line B in which an edible oil tank 6, a flowmeter 3B and a heat exchanger 4B are arranged in series are laid mutually in parallel. Both the lines are connected to the inlet side of a continuous mixer 5 for mixing and emulsification and the outlet side of the continuous mixer 5 is connected through a primary emulsified solution transporting line C to the inlet side of a finish emulsifier 9 and the outlet side of the finish emulsifier 9 is linked to a product dressing sending line D.



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CLAIMS

[Claim(s)]

[Claim 1] The seasoning liquid migration duct A in which the mixing chamber 1 of seasoning liquid, a transfer pump P1, a deaerator 2, a transfer pump P2, flowmeter 3A, and heat exchanger 4A were arranged by the serial The edible-oil migration duct B in which the edible-oil tub 6, a transfer pump P3, flowmeter 3B, and heat exchanger 4B were arranged by the serial Arrange in juxtaposition mutually and it connects with the entrance side of the continuous mixer 5 for mixed emulsification, respectively. Continuation mixing emulsification equipment of the dressing system compound liquid by the sealing circuit characterized by having connected the outlet side of this continuous mixer 5 to the entrance side of the finishing emulsifier 9 through the primary emulsified liquid migration duct C, and connecting the outlet side of this finishing emulsifier 9 to the product dressing taking-out duct D.

[Claim 2] The mixing chamber 1 of seasoning liquid is continuation mixing emulsification equipment of the dressing system compound liquid according to claim 1 with which stirring aerofoil 1a of a grid-like paddle mold is built in, and hot-water-circulating jacket 1b is prepared in the periphery.

[Claim 3] Continuation mixing emulsification equipment of the dressing system compound liquid according to claim 1 or 2 which makes [the air in liquid is made to foam and] emit outside and comes to make by connecting the vacuum pump 7 to the head-lining section of a deaerator 2, and making the inside of the tank of a deaerator 2 into a vacua by operation of this vacuum pump.

[Claim 4] A firm measurement is carried out by flow-meter 3A, and the seasoning liquid amount of supply to the continuous mixer 5 for mixed emulsification is the liquid-sending pump P2 by digital indicating-controller 8A. Drive motor M2 Claim 1 which performs feedback control to an inverter, and maintains and carries out constant feeding of the set point thru/or continuation mixing emulsification equipment of dressing system compound liquid given in three.

[Claim 5] A firm measurement is carried out by flow-meter 3B, and the food oil amount of supply to the continuous mixer 5 for mixed emulsification is the liquid-sending pump P3 by digital indicating-controller 8B. Drive motor M3 Continuation mixing emulsification equipment of the dressing system compound liquid according to claim 1 which performs feedback control to an inverter, and maintains and carries out constant feeding of the set point.

[Claim 6] The continuous mixer 5 for mixed emulsification is equipped with a cooling jacket 53 between an outer case 51 and a container liner 52. At the end of a container liner 52 Feed hopper 52a of seasoning liquid and feed hopper 52b of edible oil are prepared, and it connects with the seasoning liquid migration duct A and the edible-oil migration duct B, respectively. To the other end Continuation mixing emulsification equipment of the dressing system compound liquid according to claim 1 which primary emulsified liquid exhaust port 52c is prepared, and is connected with the finishing emulsifier 9 through the primary emulsified liquid migration duct C.

[Claim 7] In the container liner 52 of the continuous mixer 5 for mixed emulsification To the basket die opening regio oralis of rotating basket type rotary DASSHA 54 and rotary DASSHA 54 by which the stator 55 of the shape of a fixed cylinder is held in this alignment, and a rotation drive is carried out with a driving shaft 56 It is aslant attached so that two or more ctenidium-like impeller 54a may intersect a periphery and the meridianus. On a periphery Two or more scraper 54b is attached free [rocking] so that a tip may **** to the inner skin of a container liner 52, and on the other hand on the periphery of the fixed stator 55 Continuation mixing emulsification equipment of the dressing system compound liquid according to claim 6 which is aslant attached so that two or more ctenidium-like impeller 55a may project in a tangential direction mostly, and mingles each other with ctenidium-like impeller 54a of said rotary DASSHA 54.

[Claim 8] The finishing emulsifier 9 at last the inside configuration of the housing 93 equipped with the product dressing exhaust port 92 connected with the primary emulsified liquid feed hopper 91 and the taking-out duct D which were connected with the migration duct C Nothing [of breadth / the truncated cone tubed and nothing], While holding truncated cone mold Rota 94 which keeps few gaps in the interior and carries out high-speed rotation and protruding on

the inlet-port side edge plate inside of housing 93, and the minor diameter temporary region of Rota 94 the distributed gear teeth 93a and 94a which are mutually interwoven with each other and gear Continuation mixing emulsification equipment of the dressing system compound liquid according to claim 1 which comes to engrave much spline-like **** 93b and 94b on the inner circumference taper section of housing 93, and the periphery taper section of Rota 94, respectively.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention adds and adjusts salt, a saccharide, and spice sugar to indispensable raw materials, such as edible vegetable oil and fat and vinegar, or fruit juice of citrus, and relates to the continuation mixing emulsification equipment of compound liquid for manufacturing a dressing, mayonnaise, etc. which are the seasoning of the shape of emulsified liquid emulsified to the water middle oil drop type.

[0002]

[Description of the Prior Art] Although it divides roughly and the manufacturing installation of half-continuous system and continuous system is known as a dressing manufacturing installation, the former half-continuous system is difficult to be stabilized and to supply the product of uniform quality in large quantities, while a handmade product is obtained, since the mixer and the emulsifier are wide opened by atmospheric air, there is fear of foreign matter mixing and temperature and flow control are entrusted with the task of an operator.

[0003] In the process which air tends to mix it into liquid at the time of seasoning liquid mixing stirring although the latter continuous system is suitable for mass production method, residual air may cause product oxidation and poor emulsification, and carries out continuation mixing of seasoning liquid and the edible oil. There was a trouble that it was difficult for a mixed defect to arise by stirring lack of ability, or for poor emulsification to arise for the reasons of the abnormalities in emulsification temperature etc., and to obtain the product of the stable homogeneity.

[0004]

[Problem(s) to be Solved by the Invention] It makes as a technical problem that this invention solves the above-mentioned trouble. From preparation of seasoning liquid to mixed stirring with an oil and seasoning liquid, and finishing emulsification. Oxidation of a dressing is prevented as much as possible by carrying out with in-line one sealed altogether, and removing the air in liquid using a deaerator. It is going to offer the continuation mixing emulsification equipment of the dressing system compound liquid which can manufacture a dressing continuously in sanitary without fear of foreign matter mixing.

[0005]

[Means for Solving the Problem] The seasoning liquid migration duct A in which this invention provides with the means of the above-mentioned technical-problem solution, and the mixing chamber 1 of seasoning liquid, a transfer pump P1, a deaerator 2, a transfer pump P2, flowmeter 3A, and heat exchanger 4A were arranged by the serial. The edible-oil migration duct B in which the edible-oil tub 6, a transfer pump P3, flowmeter 3B, and heat exchanger 4B were arranged by the serial. Arrange in juxtaposition mutually and it connects with the entrance side of the continuous mixer 5 for mixed emulsification, respectively. The outlet side of this continuous mixer 5 is connected to the entrance side of the finishing emulsifier 9 through the primary emulsified liquid migration duct C. Let the continuation mixing emulsification equipment of the dressing system compound liquid by the sealing circuit characterized by connecting the outlet side of this finishing emulsifier 9 to the product dressing taking-out duct D be an invention summary.

[0006]

[Embodiment of the Invention] Drawing 1 -3 explain the gestalt of implementation of this invention. The process explanatory view in which drawing 1 shows the whole manufacture flow, and drawing 2 are the enlarged drawings of the continuous mixer for mixed emulsification, (a) shows the sectional side elevation of a body and (b) shows an A-A sectional view. Moreover, drawing 3 is the enlarged drawing of a finishing emulsifier, in part, (a) is a missing sectional view and (b) is this perspective view.

[0007] In drawing 1, A shows the migration duct of seasoning liquid, and the taking-out duct of the product dressing with which the migration duct of edible oil and C completed the migration duct of primary emulsified liquid, and, as for

B, D completed finishing emulsification.

[0008] The mixing chamber 1 of seasoning liquid, a transfer pump P1, a deaerator 2, a transfer pump P2, flowmeter 3A, and heat exchanger 4A are arranged in the migration duct A by the serial, and it connects with the entrance side of the continuous mixer 5 for mixed emulsification.

[0009] The edible-oil tub 6, a transfer pump P3, flowmeter 3B, and heat exchanger 4B are arranged in the migration duct B arranged in parallel in the migration duct A by the serial, and, similarly it connects with the entrance side of a continuous mixer 5. In addition, a deaerator 2 may be arranged like said duct A.

[0010] The mixing chamber 1 of seasoning liquid builds in stirring aerofoil 1a of a grid-like paddle mold, and hot-water-circulating jacket 1b is prepared in the periphery. Vinegar (**), of the amount of conventions, seasoning (**), an emulsifier (Ha), and water (d) are supplied to this mixing chamber 1, and dissolution preparation of the seasoning liquid is carried out by rotating stirring aerofoil 1a, pouring warm water to jacket 1b, and heating the liquid in a tub.

[0011] The seasoning liquid prepared by the mixing chamber 1 is the liquid-sending pump P1. It is sent to the sealing tank-like deaerator 2. Rotating distributor 2a is in a deaerator 2, the seasoning liquid supplied on this distributor 2a is distributed in the shape of a thin film, and the vacuum deairing of the air bubbles in liquid is carried out. 7 is the vacuum pump 7 connected to the head-lining section of a deaerator 2, and makes the air in the liquid mixed by the mixing chamber 1 emit outside by making the inside of the tank of a deaerator 2 into a vacua by operation of this vacuum pump 7.

[0012] The deaerated seasoning liquid is the liquid-sending pump P2. Heat exchanger 4A is sent to the continuous mixer 5 for mixed emulsification after passage through flowmeter 3A. A firm measurement is carried out by flow-meter 3A, and the amount of supply to this continuous mixer 5 is the liquid-sending pump P2 by digital indicating-controller 8A. Drive motor M2 Feedback control is performed to an inverter and it is controlled to keep constant a mixing ratio with the edible oil which maintains and carries out constant feeding of the set point, and is mentioned later. Moreover, the temperature of seasoning liquid is controlled by heat exchanger 4A, predetermined supply temperature, i.e., emulsification optimum temperature.

[0013] Edible oil is the edible-oil tub 6 to the liquid-sending pump P3. Although heat exchanger 4B is sent to the continuous mixer 5 for mixed emulsification after passage through flowmeter 3B The firm measurement of the amount of supply is carried out by flowmeter 3B like the above mentioned seasoning liquid. It is the liquid-sending pump P3 by digital indicating-controller 8B. Drive motor M3 Feedback control is performed to an inverter and it is controlled to keep constant a mixing ratio with the seasoning liquid which maintains and carried out constant feeding of the set point, and mentioned it above. Moreover, the temperature of edible oil is controlled by heat exchanger 4B, predetermined supply temperature, i.e., emulsification optimum temperature.

[0014] The detail of the continuous mixer 5 for mixed mixing emulsification is shown in drawing 2 . With the container liner, as for 51, an outer case is formed among both, and, as for 52, the cooling jacket 53 is formed. 53a is the inlet port of cooling water, and 53b is the outlet.

[0015] Feed hopper 52a of seasoning liquid and feed hopper 52b of edible oil are prepared in the end of a container liner 52, and it connects with the seasoning liquid migration duct A and the edible-oil migration duct B, respectively. Moreover, primary emulsified liquid exhaust port 52c is prepared in the other end, and it connects with the primary emulsified liquid migration duct C.

[0016] Into a container liner 52, rotating basket type rotary DASSHA 54 and the stator 55 of the shape of a fixed cylinder are held in this alignment, and the rotation drive of rotary DASSHA 54 is carried out with a driving shaft 56.

[0017] It is aslant attached so that two or more ctenidium-like impeller 54a may intersect a periphery and the meridianus, and two or more scraper 54b is attached in the periphery free [rocking] at the basket die opening regio oralis of rotary DASSHA 54 so that a tip may **** to the inner skin of a container liner 52.

[0018] On the periphery of a stator 55, it is aslant attached so that two or more ctenidium-like impeller 55a may project in a tangential direction mostly, and it mingles each other with ctenidium-like impeller 54a of said rotary DASSHA 54.

[0019] The raw material liquid which consists of the seasoning liquid and edible oil of the predetermined temperature supplied from feed hoppers 52a and 52b It passes through the inside of a container liner 52, sequential cooling being carried out with the cooling water which passes a cooling jacket 53. The meantime mixes and stirs powerfully by ctenidium-like impeller 54a of basket type rotary DASSHA 54, and ctenidium-like impeller 55a of a stator 55, and it emulsifies, and it becomes primary emulsified liquid, is discharged from exhaust port 52c, and is sent to the finishing emulsifier 9 of degree process through the migration duct C.

[0020] If the mixed stirring operation in this continuous mixer 5 is explained and rotary DA@SSHA 54 will be counterclockwise rotated in drawing 2 (b), the wall of a container liner 52 is scratched by the inner sense by scraper 54b, raw material liquid will be guided to a core and mixed stirring will be powerfully carried out with the ctenidium-like

impellers 54a and 55a which are mutually interwoven with each other.

[0021] Although ctenidium-like impeller 55a of a stator 55 has stopped, if ctenidium-like impeller 54a of rotary DASSHA 54 rotates counterclockwise, it will rotate clockwise relatively, and the liquid of a core is extruded outward, with the ctenidium-like impellers 54a and 55a which are mutually interwoven with each other, it will receive a shear operation and mixed stirring will be powerfully carried out.

[0022] Control of a mixed emulsification condition is performed by controlling the rotational frequency of rotary DASSHA 54. The temperature rise resulting from mixed stirring in a continuous mixer 5 is prevented by the flow regulation of cooling water which passes a cooling jacket 53, and is controlled to always maintain the optimal emulsification temperature.

[0023] The detail of the finishing emulsifier 9 is shown in drawing 3. 91 is a primary emulsified liquid feed hopper, and is connected with the migration duct C. 92 is a product dressing exhaust port and is connected with the taking-out duct D.

[0024] As for the inside configuration of the housing 93 equipped with said primary emulsified liquid feed hopper 91 and the product dressing exhaust port 92, truncated cone mold Rota 94 which places and carries out high-speed rotation is held [gaps / to nothing and its interior / few] in the truncated cone tubed of breadth at last.

[0025] The distributed gear teeth 93a and 94a which are mutually interwoven with each other and gear protrude on the inlet-port side edge plate inside of housing 93, and the minor diameter temporal region of Rota 94, and much spline-like **** 93b and 94b are engraved on the inner circumference taper section of housing 93, and the periphery taper section of Rota 94, respectively.

[0026] The primary emulsified liquid sent through the migration duct C from the continuous mixer 5 of a last process It is pushed in by pumping pressure in the finishing emulsifier 9 from the primary emulsified liquid feed hopper 91. First Distributed gear-tooth 93a of the inlet-port side edge plate inside of housing 93, Distribute finely between distributed gear-tooth 94a of the minor diameter temporal region of Rota 94, and it is sent to the taper section with the centrifugal force accompanying high-speed rotation of Rota 94. It is equalized still more minutely by spline-like **** 93b and 94b, and becomes the dressing of a final product, and it is discharged by the taking-out duct D from an exhaust port 92, and is transported to restoration / package section which is not illustrated.

[0027] Flowmeter 3D is inserted in the taking-out duct D, the flow rate of a product dressing is always measured, and the measurement value is supplied to a ratio station 10. In a ratio station 10, said measurement value is distributed to the mixed ratio of the seasoning liquid and edible oil which were set up beforehand, and is fed back to the digital directions flow meters 8A and 8B, respectively. If the fed-back product flow rate and a current setting flow rate are measured in digital directions flow-meter 8A and there are excess and deficiency Liquid-sending pump P2 Drive motor M2 Take out increase and decrease of a command to an inverter, and it sets to digital directions flowmeter 8B similarly. If the fed-back product flow rate and a current setting flow rate are measured and there are excess and deficiency, it will be the liquid-sending pump P3. Drive motor M3 Increase and decrease of a command are taken out to an inverter, and it is controlled to maintain an appropriate flow, respectively.

[0028]

[Effect of the Invention] The seasoning liquid migration duct A in which this invention is a configuration as explained in full detail above, and the mixing chamber 1 of seasoning liquid, a transfer pump P1, a deaerator 2, a transfer pump P2, flowmeter 3A, and heat exchanger 4A were arranged by the serial The edible-oil migration duct B in which the edible-oil tub 6, a transfer pump P3, flowmeter 3B, and heat exchanger 4B were arranged by the serial Arrange in juxtaposition mutually and it connects with the entrance side of the continuous mixer 5 for mixed mixing emulsification, respectively. By having connected the outlet side of this continuous mixer 5 to the entrance side of the finishing emulsifier 9 through the primary emulsified liquid migration duct C, and having connected the outlet side of this finishing emulsifier 9 to the product dressing taking-out duct D It passes through the primary emulsification by mixed stirring with an oil and seasoning liquid from preparation of seasoning liquid. To finishing emulsification of a final process By being able to carry out with in-line one sealed altogether, and removing the air in liquid using a deaerator, oxidation of a dressing can be prevented as much as possible, and the mixed emulsification equipment which can produce a dressing continuously in sanitary without fear of foreign matter mixing can be offered.

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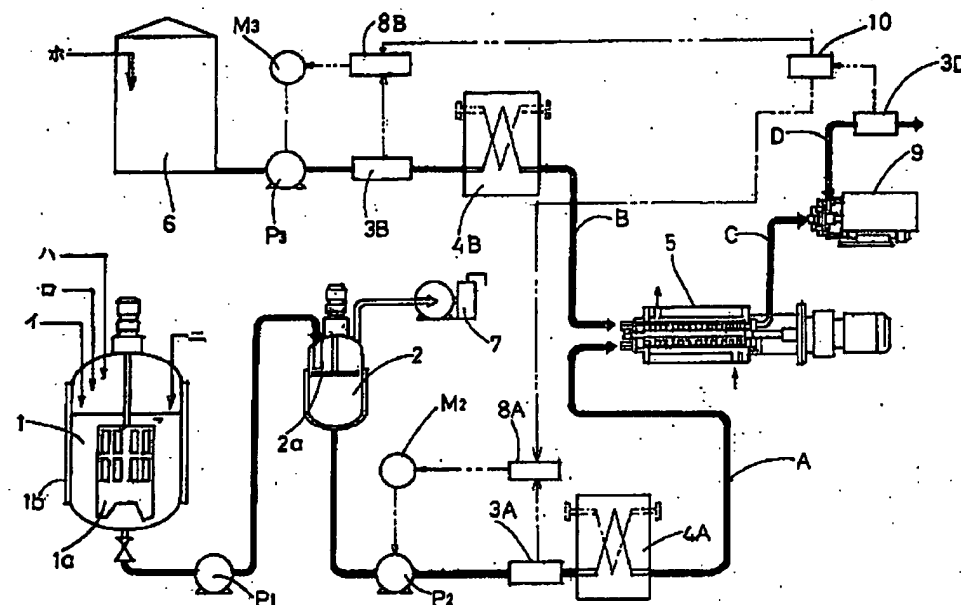
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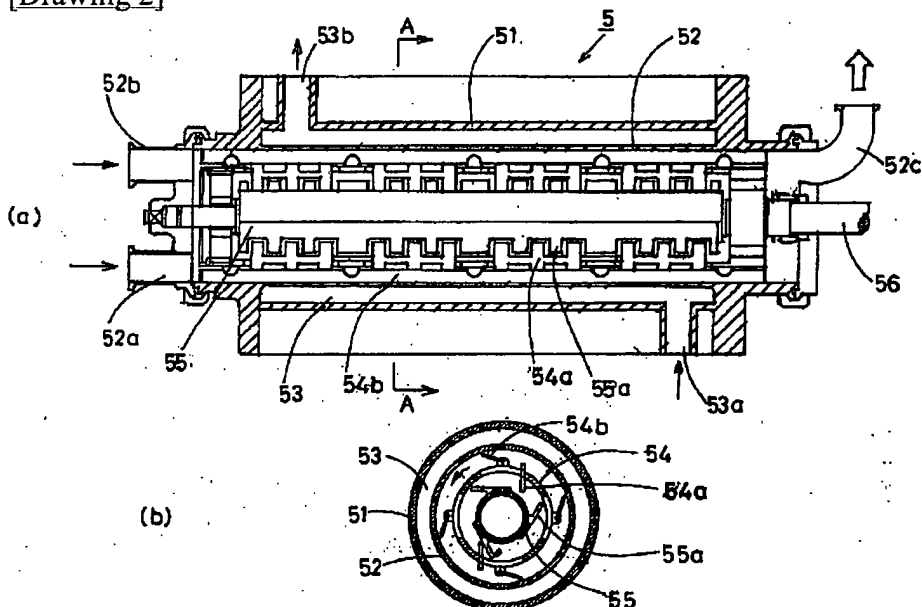
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DRAWINGS

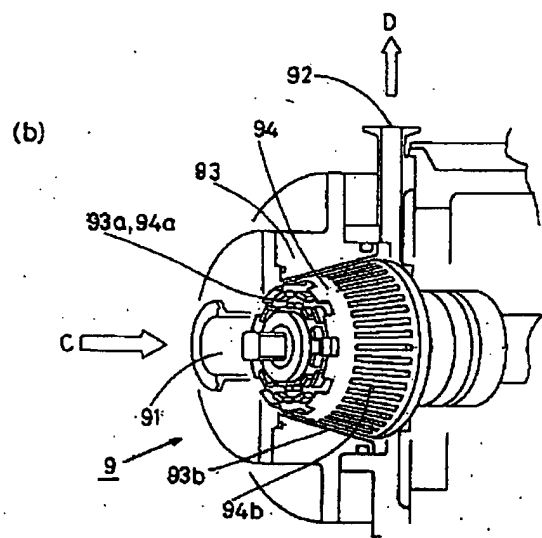
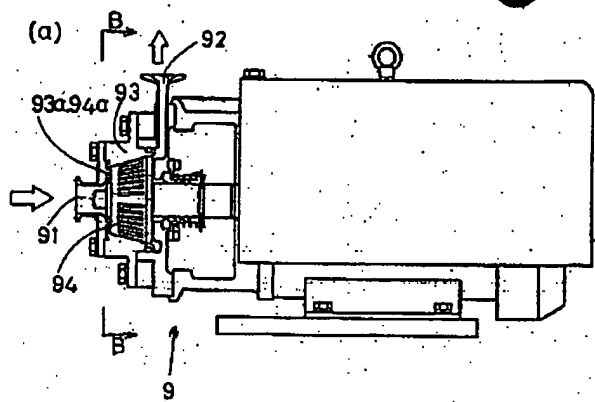
[Drawing 1]



[Drawing 2]



[Drawing 3]



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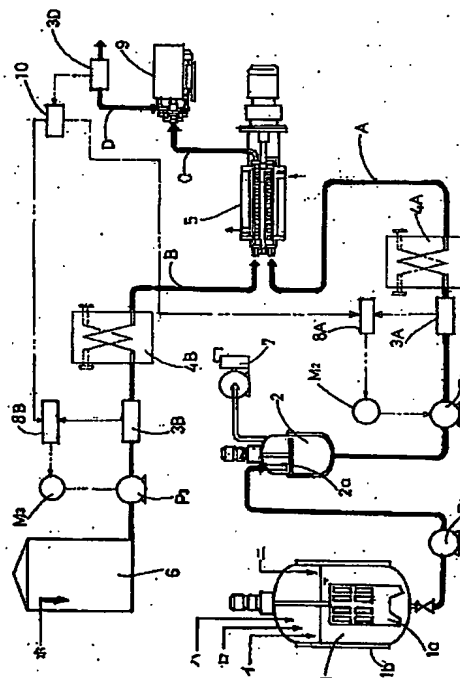
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(54) 【発明の名称】 ドレッシング系複合液の連続混合乳化装置

(57) 【要約】

【課題】 調味液の調合から、油と調味液との混合攪拌、仕上げ乳化まで、全て密閉されたインラインで行い、かつ、脱気装置を使用して液中の空気を除去することによりドレッシングの酸化を極力防止し、異物混入の虞れなくサニタリー的にドレッシングを連続的に混合・乳化する装置を提供すること。

【解決手段】 調味液の混合槽1、脱気装置2、流量計3A、熱交換器4Aが直列に配設された調味液移送管路Aと、食用油槽6、流量計3B、熱交換器4Bが直列に配設された食用油移送管路Bとを、互いに並列に配設して夫々混合乳化用連続ミキサー5の入口側に接続し、該連続ミキサー5の出口側を、一次乳化液移送管路Cを介して仕上げ乳化機9の入口側に接続し、該仕上げ乳化機9の出口側を製品ドレッシング搬出管路Dに接続したことを特徴とするドレッシング系複合液の連続混合乳化装置。



【特許請求の範囲】

【請求項 1】 調味液の混合槽 1、移送ポンプ P₁、脱気装置 2、移送ポンプ P₂、流量計 3 A、熱交換器 4 A が直列に配設された調味液移送管路 A と、食用油槽 6、移送ポンプ P₃、流量計 3 B、熱交換器 4 B が直列に配設された食用油移送管路 B とを、互いに並列に配設して夫々混合乳化用連続ミキサー 5 の入口側に接続し、該連続ミキサー 5 の出口側を、一次乳化液移送管路 C を介して仕上げ乳化機 9 の入口側に接続し、該仕上げ乳化機 9 の出口側を製品ドレッシング搬出管路 D に接続したことを特徴とする密閉回路によるドレッシング系複合液の連続混合乳化装置。

【請求項 2】 調味液の混合槽 1 は、格子状パドル型の攪拌翼 1 a を内蔵し、外周には温水循環ジャケット 1 b が設けられている請求項 1 記載のドレッシング系複合液の連続混合乳化装置。

【請求項 3】 脱気装置 2 の天井部には真空ポンプ 7 が接続されており、該真空ポンプの運転により脱気装置 2 のタンク内を真空状態とすることによって、液中の空気を発泡させ外部に放出させるようにしてなる請求項 1 又は 2 記載のドレッシング系複合液の連続混合乳化装置。

【請求項 4】 混合乳化用連続ミキサー 5 への調味液供給量は、流量計 3 A により常時測定し、デジタル指示調節計 8 A によって送液ポンプ P₂ の駆動モータ M₂ のインバータにフィードバック制御を行い、設定値を保ち定量供給するようになっている請求項 1 ないし 3 記載のドレッシング系複合液の連続混合乳化装置。

【請求項 5】 混合乳化用連続ミキサー 5 への食料油供給量は、流量計 3 B により常時測定し、デジタル指示調節計 8 B により送液ポンプ P₃ の駆動モータ M₃ のインバータにフィードバック制御を行い、設定値を保ち定量供給するようになっている請求項 1 記載のドレッシング系複合液の連続混合乳化装置。

【請求項 6】 混合乳化用連続ミキサー 5 は、外筒 5 1 と内筒 5 2 の間に冷却ジャケット 5 3 を備え、内筒 5 2 の一端には、調味液の供給口 5 2 a 及び食用油の供給口 5 2 b が設けられ、それぞれ、調味液移送管路 A 及び食用油移送管路 B に接続され、他端には、一次乳化液排出口 5 2 c が設けられ、一次乳化液移送管路 C を介して仕上げ乳化機 9 に接続されている請求項 1 記載のドレッシング系複合液の連続混合乳化装置。

【請求項 7】 混合乳化用連続ミキサー 5 の内筒 5 2 内には、回転する箱型のロータリーダッチャ 5 4 と、固定された円筒状のステータ 5 5 が同心に收容され、駆動軸 5 6 により回転駆動されるロータリーダッチャ 5 4 の箱型開口部には、複数個の櫛歯状攪拌羽根 5 4 a が円周および径線と交差するように斜めに取り付けられ、また、外周には、先端が内筒 5 2 の内周面に摺接するように複数個のスクレーパ 5 4 b が揺動自在に取り付けられており、一方、固定されたステータ 5 5 の外周には、複数個

の櫛歯状攪拌羽根 5 5 a がほぼ接線方向に突出するように斜めに取り付けられ、前記ロータリーダッチャ 5 4 の櫛歯状攪拌羽根 5 4 a と交錯し合っている請求項 6 記載のドレッシング系複合液の連続混合乳化装置。

【請求項 8】 仕上げ乳化機 9 は、移送管路 C に連結された一次乳化液供給口 9 1 及び搬出管路 D に連結された製品ドレッシング排出口 9 2 を備えたハウジング 9 3 の内側形状を末広がりの截頭円錐筒状となし、その内部に僅かの間隙を置いて高速回転する截頭円錐型ロータ 9 4 を收容し、ハウジング 9 3 の入口側端板内面とロータ 9 4 の小径側頭部に、互いに交錯して噛み合う分散歯 9 3 a、9 4 a を突設すると共に、ハウジング 9 3 の内周テーパ部とロータ 9 4 の外周テーパ部に、それぞれスプライン状の溝歯 9 3 b、9 4 b を多数刻設してなる請求項 1 記載のドレッシング系複合液の連続混合乳化装置。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】この発明は、食用植物油及び食酢若しくは柑橘類の果汁等の必須原材料に、食塩、糖類、香辛料糖を加えて調整し、水中油滴型に乳化した乳化液状の調味料であるドレッシングやマヨネーズ等を製造するための、複合液の連続混合乳化装置に関するものである。

【0002】

【従来の技術】ドレッシング製造装置としては、大別して、半連続式と連続式の製造装置が知られているが、前者の半連続式は、ミキサー及び乳化機が大気開放されているため異物混入の虞れがあり、また、温度及び流量調整が作業者に一任されているので、手作りの製品が得られる反面、均一な品質の製品を安定して大量に供給することが困難である。

【0003】後者の連続式は、大量生産には適しているものの、調味液混合攪拌時に液中に空気が混入し易く、残留空気が製品酸化及び乳化不良の原因となることがあり、また、調味液と食用油とを連続混合する工程において、攪拌力不足により混合不良が生じたり、乳化温度異常等の理由により乳化不良が生じたりして、安定した均一の製品を得ることが困難であるという問題点があった。

【0004】

【発明が解決しようとする課題】この発明は、上記問題点を解決することを課題としてなされたものであって、調味液の調合から、油と調味液との混合攪拌、仕上げ乳化まで、全て密閉されたインラインで行い、かつ、脱気装置を使用して液中の空気を除去することによりドレッシングの酸化を極力防止し、異物混入の虞れなくサニタリ的にドレッシングを連続的に製造することができ、ドレッシング系複合液の連続混合乳化装置を提供しようとするものである。

【0005】

【課題を解決するための手段】この発明は、上記課題解決の手段を提供するものであって、調味液の混合槽1、移送ポンプP₁、脱気装置2、移送ポンプP₂、流量計3A、熱交換器4Aが直列に配設された調味液移送管路Aと、食用油槽6、移送ポンプP₃、流量計3B、熱交換器4Bが直列に配設された食用油移送管路Bとを、互いに並列に配設して夫々混合乳化用連続ミキサー5の入口側に接続し、該連続ミキサー5の出口側を、一次乳化液移送管路Cを介して仕上げ乳化機9の入口側に接続し、該仕上げ乳化機9の出口側を製品ドレッシング搬出管路Dに接続したことを特徴とする密閉回路によるドレッシング系複合液の連続混合乳化装置を発明要旨とするものである。

【0006】

【発明の実施の形態】図1～3によりこの発明の実施の形態について説明する。図1は製造フロー全体を示す工程説明図、図2は混合乳化用連続ミキサーの拡大図であって、(a)は本体の側断面図、(b)はA～A断面図を示す。また、図3は仕上げ乳化機の拡大図であって、(a)は一部欠截断面図、(b)は同斜視図である。

【0007】図1において、Aは調味液の移送管路、Bは食用油的移送管路、Cは一次乳化液の移送管路、Dは仕上げ乳化を終えた製品ドレッシングの搬出管路を示す。

【0008】移送管路Aには、調味液の混合槽1、移送ポンプP₁、脱気装置2、移送ポンプP₂、流量計3A、熱交換器4Aが直列に配設され、混合乳化用連続ミキサー5の入口側に接続されている。

【0009】移送管路Aに並列する移送管路Bには、食用油槽6、移送ポンプP₃、流量計3B、熱交換器4Bが直列に配設され、同じく連続ミキサー5の入口側に接続されている。なお、前記管路Aと同様に脱気装置2を配設してもよい。

【0010】調味液の混合槽1は、格子状パドル型の攪拌翼1aを内蔵し、外周には温水循環ジャケット1bが設けられている。この混合槽1に規定量の食酢(イ)、調味料(ロ)、乳化剤(ハ)及び水(ニ)を投入し、ジャケット1bに温水を流して槽内の液を加熱しながら、攪拌翼1aを回転させることにより調味液を溶解調合する。

【0011】混合槽1で調合された調味液は、送液ポンプP₁により密閉タンク状の脱気装置2に送られる。脱気装置2内には回転する分散板2aがあり、この分散板2a上に供給された調味液は薄膜状に分散され液中の気泡は真空脱気される。7は脱気装置2の天井部に接続された真空ポンプ7であって、この真空ポンプ7の運転により、脱気装置2のタンク内を真空状態とすることによって、混合槽1で混入した液中の空気を外部に放出させるのである。

【0012】脱気した調味液は、送液ポンプP₂により流量計3Aを経て熱交換器4Aを通過後、混合乳化用連続ミキサー5へと送られる。この連続ミキサー5への供給量は、流量計3Aにより常時測定し、デジタル指示調節計8Aによって送液ポンプP₂の駆動モータM₂のインバータにフィードバック制御を行い、設定値を保ち定量供給するようになっており、後述する食用油との混合比を一定に保つよう制御されている。また、調味液の温度は熱交換器4Aにより所定の供給温度すなわち乳化最適温度に制御されている。

【0013】食用油は、食用油槽6から、送液ポンプP₃により流量計3Bを経て熱交換器4Bを通過後、混合乳化用連続ミキサー5に送られるが、その供給量は、前記した調味液と同様に、流量計3Bにより常時測定し、デジタル指示調節計8Bにより送液ポンプP₃の駆動モータM₃のインバータにフィードバック制御を行い、設定値を保ち定量供給するようになっており、前述した調味液との混合比を一定に保つよう制御されている。また、食用油的温度は熱交換器4Bにより所定の供給温度すなわち乳化最適温度に制御されている。

【0014】図2に混合混合乳化用連続ミキサー5の詳細を示す。51は外筒、52は内筒で両者の間に冷却ジャケット53が形成されている。53aは冷却水の入口、53bはその出口である。

【0015】内筒52の一端には、調味液の供給口52a及び食用油的供給口52bが設けられ、それぞれ、調味液移送管路A及び食用油移送管路Bに連結されている。また、他端には、一次乳化液排出口52cが設けられ、一次乳化液移送管路Cに連結されている。

【0016】内筒52内には、回転する籠型のロータリーダッチャ54と、固定された円筒状のステータ55が同心に収容され、ロータリーダッチャ54は、駆動軸56により回転駆動されるようになっている。

【0017】ロータリーダッチャ54の籠型開口部には、複数の歯状攪拌羽根54aが円周および径線と交差するように斜めに取り付けられ、また、外周には、先端が内筒52の内周面に摺接するように複数のスクレーパ54bが揺動自在に取り付けられている。

【0018】ステータ55の外周には、複数の歯状攪拌羽根55aがほぼ接線方向に突出するように斜めに取り付けられ、前記ロータリーダッチャ54の歯状攪拌羽根54aと交錯し合っている。

【0019】供給口52a、52bから供給された所定温度の調味液と食用油とからなる原料液は、冷却ジャケット53を通過する冷却水により順次冷却されつつ内筒52内を通過し、その間に籠型ロータリーダッチャ54の歯状攪拌羽根54aとステータ55の歯状攪拌羽根55aにより強力に混合、攪拌されて乳化し、一次乳化液となって排出口52cから排出され、移送管路Cを経て次工程の仕上げ乳化機9へ送られる。

【0020】この連続ミキサー5内における混合攪拌作用について説明すると、ロータリーダッシャ54を、図2(b)において反時計方向に回転させると、内筒52の内壁はスクレーパ54bによって内向きに掻き取られ原料液は中心部へと誘導され、互いに交錯する櫛歯状攪拌羽根54a、55aによって強力に混合攪拌される。

【0021】ステータ55の櫛歯状攪拌羽根55aは停止しているが、ロータリーダッシャ54の櫛歯状攪拌羽根54aが反時計方向に回転すれば、相対的には時計方向に回転することとなり、中心部の液は外向きに押し出され、互いに交錯する櫛歯状攪拌羽根54a、55aによって剪断作用を受け、強力に混合攪拌されるのである。

【0022】混合乳化状態の制御は、ロータリーダッシャ54の回転数を制御することにより行われる。連続ミキサー5内における混合攪拌に起因する温度上昇は、冷却ジャケット53を通過する冷却水の流量調節により防止され、常に最適乳化温度を保つように制御される。

【0023】図3に、仕上げ乳化機9の詳細を示す。91は一次乳化液供給口であって移送管路Cに連結されている。92は製品ドレッシング排出口であって搬出管路Dに連結されている。

【0024】前記一次乳化液供給口91および製品ドレッシング排出口92を備えたハウジング93の内側形状は末広がりの截頭円錐筒状をなし、その内部に僅かの間隙を置いて高速回転する截頭円錐型ロータ94が収容されている。

【0025】ハウジング93の入口側端板内面とロータ94の小径側頭部には、互いに交錯して噛み合う分散歯93a、94aが突設され、また、ハウジング93の内周テーパ部とロータ94の外周テーパ部には、それぞれスプライン状の溝歯93b、94bが多数刻設されている。

【0026】前工程の連続ミキサー5から移送管路Cを経て送られる一次乳化液は、ポンプ圧により一次乳化液供給口91から仕上げ乳化機9内に押し込まれ、先ず、ハウジング93の入口側端板内面の分散歯93aと、ロータ94の小径側頭部の分散歯94aとの間で細かく分散され、ロータ94の高速回転に伴う遠心力でテーパ部へ送られ、スプライン状の溝歯93b、94bにより更に微細に均一化され、最終製品のドレッシングとなって排出口92から搬出管路Dに排出され、図示しない充填・包装部へと移送される。

【0027】搬出管路Dには流量計3Dが挿入されており、常時製品ドレッシングの流量を計測し、その計測値は比率設定器10に投入される。比率設定器10においては前記計測値を予め設定された調味液と食用油との混合比率に配分して、夫々デジタル指示流量計8A、8Bにフィードバックする。デジタル指示流量計8Aにおい

ては、フィードバックされた製品流量と現在の設定流量とを比較し、過不足があれば、送液ポンプP2の駆動モータM2のインバータに増減指令を出し、同様に、デジタル指示流量計8Bにおいては、フィードバックされた製品流量と現在の設定流量とを比較し、過不足があれば、送液ポンプP3の駆動モータM3のインバータに増減指令を出し、夫々適正流量を維持するように制御される。

【0028】

【発明の効果】この発明は以上詳述したとおりの構成であって、調味液の混合槽1、移送ポンプP1、脱気装置2、移送ポンプP2、流量計3A、熱交換器4Aが直列に配設された調味液移送管路Aと、食用油槽6、移送ポンプP3、流量計3B、熱交換器4Bが直列に配設された食用油移送管路Bとを、互いに並列に配設して夫々混合混合乳化用連続ミキサー5の入口側に接続し、該連続ミキサー5の出口側を、一次乳化液移送管路Cを介して仕上げ乳化機9の入口側に接続し、該仕上げ乳化機9の出口側を製品ドレッシング搬出管路Dに接続したことにより、調味液の調合から、油と調味液との混合攪拌による一次乳化を経て最終工程の仕上げ乳化まで、全て密閉されたインラインで行うことができ、かつ、脱気装置を使用して液中の空気を除去することによりドレッシングの酸化を極力防止し、異物混入の虞れなくサニタリー的にドレッシングを連続生産することができる混合乳化装置を提供することができる。

【図面の簡単な説明】

【図1】製造フロー全体を示す工程説明図である。

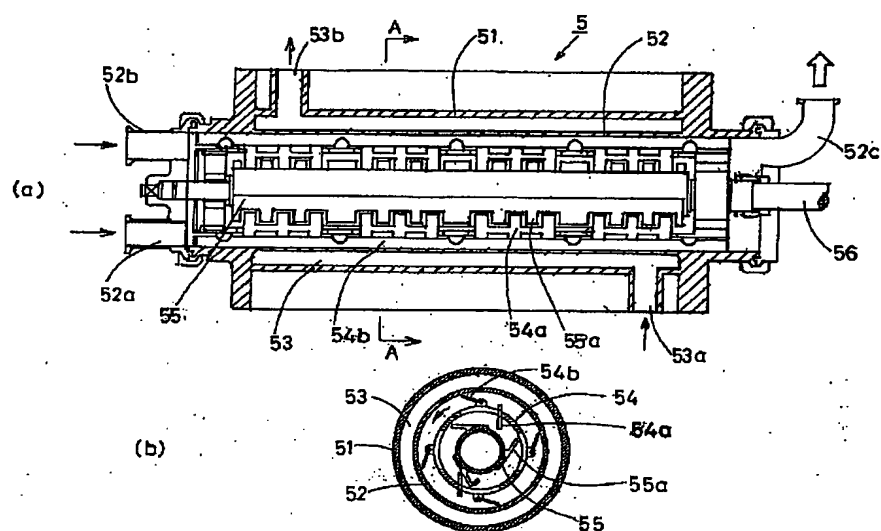
【図2】混合混合乳化用連続ミキサー5の拡大図であって、(a)は本体の側断面図、(b)はA～A断面図を示す。

【図3】図3は仕上げ乳化機9の拡大図であって、(a)は一部欠断面図、(b)は同斜視図である。

【符号の説明】

- A 調味液の移送管路
- B 食用油の移送管路
- C 一次乳化液の移送管路
- D 製品ドレッシングの搬出管路
- P1, P2, P3 送液ポンプ
- M2 送液ポンプP2の駆動モータ
- M3 送液ポンプP3の駆動モータ
- 1 調味液の混合槽
- 1a 格子状パドル型の攪拌翼
- 1b 温水循環ジャケット
- 2 脱気装置
- 2a 回転分散板
- 3A, 3B, 3D 流量計
- 4A, 4B 熱交換器
- 5 混合乳化用連続ミキサー
- 6 食用油槽

【図 2】



【図 3】

